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SCIENTIFIC NOTE

Infestation of *Sybra alternans* (Cerambycidae: Coleoptera) in a Hawaii Banana Plantation

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Abstract: *Sybra alternans* Wiedemann (Cerambycidae: Coleoptera) was found in a Hawaii banana farm feeding on the dried blossom end of 'Williams' banana fruits. The infestation was surveyed and evaluated. This beetle was first reported in the Hawaiian Islands in 1917. The host range of *S. alternans* has been described by many authors, however, this is the first report of this beetle infesting banana. The potential significance of this finding is discussed, and a broader and periodical inspection for this beetle on banana farms is recommended.

One of the early shipments of Hawaiian bananas to Japan was rejected at the port of entry on July 16, 1999, due to the presence of an actionable immature insect found feeding inside one of the fingers. Being an actionable pest and an unknown species, fumigation, which is required of almost all shipments of fresh fruits into Japan, was refused. The information provided by the importer included pictures of the immature insect inside the banana which looked like a caterpillar. The economic impact of such a rejection is significant to any sized farm. Consequently, a field survey was requested with the objective of identifying the pest and determining the extent of its infestation for this banana-exporting farm.

The field inspection was conducted on July 23, 1999. Four out of thirty blocks were randomly selected and sampled. The size of the blocks were 8.6 (block 5), 10.2 (block 17), 8.7 (block 27), and 15.0 (block 28) acres. Thirteen additional samples were examined at the packing station. Only banana bunches ready for harvest were surveyed in the field. The maximum harvesting age was 13 weeks. A total of 20 bunches were sampled with five bunches per block. Infested fingers were carefully cut open at the blossom end to determine the level of damage and whether the caterpillar-like immature insects were still alive and feeding in the pulp. Further, 69 banana fingers with infested blossom ends out of the 20 sampled bunches were collected and taken to the entomology laboratory of Hawaii Agriculture Research Center for further evaluation.

Field Observation

In fields 5 and 17, over 20 percent of the bananas were damaged on the dried blossom ends. When damaged bananas were carefully cut open at the blossom end, immature insects were found boring in and feeding in the banana pulp of many of the individual fingers. One adult long-horned beetle was found at the dried blossom end and collected. One caterpillar was found on the skin of a banana fruit causing scarification. However, the immature insects that were feeding on the dried blossom ends of the banana fruits were recognized as beetle larvae, not caterpillars, and were collected. When cut at about 2.5 cm from the tip of the infested finger, a black tunnel caused by the feeding larvae could be seen in the center of

the fruit. In fields 27 and 28, beetle damage counts were as low as one out of 30 bananas (3.3%). Thirteen cluster samples were examined for beetle damage at the plantation's banana packing plant. An average infestation rate of beetle larvae of 8.5 percent was recorded.

Laboratory Rearing

The 69 infested fingers collected from the fields were held in insect rearing cages in the laboratory for 13 days. Twenty-seven were cut at the tips and each tip was transferred to a 30 ml plastic rearing cup for insect emergence. The remaining bananas were held in the rearing cages. Two adult long-horned beetles emerged from the rearing cages. Unfortunately, the banana tips in plastic cups started to mold after four days. An immature insect was observed in one of the 27 cups, but it's identification was not made due to the molding of the banana tips.

Insect Identification

The adult long-horned beetle caught on a banana blossom tip in the field and two that emerged from the rearing cages were identical and identified by insect taxonomist, Bernarr Kumashiro of the Hawaii State Department of Agriculture as *Sybra alternans*(Wiedemann). The caterpillar collected on the banana skin in the field was identified as the banana moth, *Opogona sacchari*.

Biology

The limited literature on *Sybra alternans* focuses on its distribution and host range, with little description of its biology. However, according to Duffy (1953), the mature larva is 12 mm in length, 2.9 mm breadth, meso- and metanotum slightly shining, smooth abdomen with ampullae not bilobed. Swezey (1950) reported that *Sybra* beetle's life cycle was approximately four months in length, with a rather long larval stage characteristic of cerambycids. It is nocturnal and seems to prefer host plants that are thoroughly dried (Notes and Exhibitions 1951). The larvae eventually bore into the wood to pupate (Swezey 1950).

Distribution

Sybra alternans is known to be distributed in Indonesia, Philippines, Micronesia, and Hawaiian Islands (Gressitt 1956, Duffy 1963). In Hawaii, it was first recorded in Honolulu, Oahu, where it was recognized in material coming from Philippines, on July 6, 1917 (Fullaway 1922). Subsequently, it was again reported on the island of Hawaii in 1928 (Notes and Exhibitions 1928), on the Island of Molokai in 1930 (Notes and Exhibitions 1934), on the Island of Lanai in 1939 (Sakimura and Linford 1940), on the Island of Maui in 1943 (Krauss 1944a), and on the Island of Kauai in 1944 (Krauss 1944b). *Sybra alternans* was one of the species that was recorded in the collections from Midway Atoll, where many insects were introduced from Hawaii through shiploads of soil intended for a cable station (Suehiro 1960). It also occurred in collections from Kwajalein Atoll (Sugerman 1972, 1979).

Host Range

Sybra alternans has a wide host range including dry limbs of live fig trees (Notes and Exhibitions 1927); stems of jack beans (Notes and Exhibitions 1928); dead aerial roots of *Pandanus* (Swezey, 1931); dead stems of most kinds of trees and shrubs of the lowlands

(Notes and Exhibitions, 1934); dead stems of basil and cocklebur (Swezey 1935a); dead twigs of cotton (Swezey 1935b); dead branches of breadfruit trees (Notes and Exhibitions 1935, 1949); pineapple (Sakimura and Linford 1940); garden bean (Holdaway and Look 1942); *Cordia* fruits (Notes and Exhibitions 1947); dead *Euphorbia* plants (Notes and Exhibitions 1951, Duffy 1953); dying stems of *Euphorbia multiformis* and algaroba (*Prosopis*) trees (Swezey 1954); dead branches of *Artocarpus*, *Barringtonia*, *Cycas*, *Triphasia* (Duffy 1963, Gressitt 1956); peduncles of passion fruit (in this case, *S. alternans* damage caused some fruits to drop prematurely) (Notes and Exhibitions 1957); *Hibiscus*, *Ficus*, *Cordia*, and pseudo-bulbs of various orchid species (Notes and Exhibitions 1949, Duffy 1953, 1963); and klu pods and its seed coats (Hinckley 1960). It is generally believed that Hawaiian cerambycid species are associated with introduced plants (there are no native cerambycids) and therefore occur primarily at low altitudes (below 900 meters) (Gressitt and Davis, 1972). *Sybra alternans* was also reported feeding on sugarcane smut chlamydospores in Hawaii (Bowler et al. 1977), and it was observed as a secondary pest on the dying branches of a *Pittosporum tobira* hedge (Notes and Exhibitions 1981).

Discussion

The significant finding of this survey was that the immature insects feeding on the dried blossom ends of the banana fruits were the beetle larvae, not the caterpillars. Although there have been many reports of *Sybra alternans* attacking various plants in Hawaii, there have been no previous reports of *S. alternans* infesting banana. Therefore, this report could be the first instance of *Sybra alternans* in banana. Different fields had different infestation rates which might be the result of differences in surrounding vegetation or moisture, or field sanitation. *S. alternans* infestations potentially could spread and increase in a short time. Therefore, control strategies are imperative. The economic impact of *Sybra alternans* will be a function of several factors, such as farm size, yields, price per box or pound, transportation cost, crop insurance, etc.; the overall loss to the banana industry if not treated could be worth millions of dollars (Fonsah and Chidefelu, 1995). Possible infestations of *Sybra alternans* should be inspected in banana plantations in Hawaii and other banana growing regions around the world. A thorough study is recommended on *S. alternans'* biology, host range, damage and economic impact in the banana industry if more infestations are discovered.

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